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slow recall of unpleasant ideas. Obviously the method needs further development.

More definite results appear which bear on general rather than individual psychology. In the first place, it is evident that for the majority of the observers (72%) the average time for recalling unpleasant experiences is at least slightly longer than that for recalling pleasant experiences. The difference in time is very slight, however: the average reaction time for pleasant recalls is 3.05, with a m.v. of .24; the average reaction time for unpleasant recalls is 3.35 m.v. 19. That recall of pleasant experiences occurs more readily than recall of unpleasant experiences is further indicated by the number of zero cases, or cases where the observer failed in fifteen seconds to associate any pleasant or unpleasant experience with the stimulus word. The total number of zero cases for the recall of unpleasant experiences was 144; for the recall of pleasant experiences it was only 90.

Further, a rather curious relation appeared when we reckoned the total number of cases where the pleasant or unpleasant experience recalled was reported as physical and the total number where it was reported as mental. Obviously much inexactness in the use of these terms was to be expected of our observers. The number of pleasant experiences recalled where the pleasantness was classed by the observer as mental was 733; in only 647 cases was the pleasantness classed as physical. The number of cases where the unpleasant experience recalled was classed as mentally unpleasant was only 649; the number of cases where it was classed as physically unpleasant was 734. Thus physical unpleasantness would seem to be more readily recalled than mental unpleasantness, and mental pleasantness more readily recalled than physical pleasantness. The greater readiness to recall physical rather than mental unpleasantness might be due to the fact that mental unpleasantnesses are apt to be involved with complexes and hence tend to be suppressed; quite possibly also to the fact that physical unpleasantness (usually pain) is more homogeneous than mental unpleasantness and hence easier to recall. This suggestion was made by Professor Colvin during a discussion of these results before the Columbia Psychological Club. It is hard to explain why the pleasantnesses recalled should be so much oftener mental than physical. Possibly the fact is due to a tendency to avoid recognizing that one's pleasures are physical; the habit or convention of regarding physical pleasures as unworthy and undignified.

XXXIII. ACCURACY OF VISUAL MEMORY AND SPEED OF VERBAL PERCEPTION IN POOR SPELLERS

By ANNETTE HOWELL, LUCILE HOPSON and M. F. WASHBURN.

The English Department of Vassar College has the custom of selecting each year a group of conspicuously bad spellers from among its students, and subjecting them to special training in spelling. It occurred to us that an opportunity was thereby offered to the Department of Psychology for an investigation of the psychological characteristics of this selected group. We have to present in the following paper the results of certain tests made upon forty-eight notably poor spellers and an equal number of good spellers. The good spellers were selected simply on their own testimony; but bad spelling seems

to be so fashionable a weakness nowadays that people are in general willing to admit the fact that they are subject to it. It seems probable that a person who declares himself a good speller really is at least fairly good, since no social opprobrium attaches to the bad speller.

Everyone who has considered the problem presented by the constitutionally poor speller has weighed the possibility that such persons may be poor visualizers. Two of our tests were accordingly directed towards finding how our groups compared in the matter of visual memory. We first gave our observers tests of visual-verbal and auditory-verbal memory. Two passages of prose approximately equally difficult were presented: one was read aloud twice, and at the end of the second reading the observer was asked to reproduce the passage as far as possible in the original words: the other was read through silently twice by the observer herself and reproduced as far as possible in the original words. Each of the passages was used with half the observers for auditory presentation, and with the other half for visual presentation. The percentage of words correctly reproduced by each observer for each of the two passages was found.

Since in learning verbal material that is visually presented the words may be translated into auditory-motor processes, it seemed advisable to add a test of visual memory for material that could not be thus translated. Accordingly we presented to our observers a series of ten cards on each of which four nonsense figures were drawn in red ink. The figures were composed of straight lines, usually eight lines to a figure.

Each card was shown to the observer for ten seconds, and at the end of this time she was required to draw as much as she could of the figures on the card. The experiment thus tested the accuracy of the visual memory after-image, which was represented by the percentage of lines correctly recalled. Little if any verbal imagery accompanied these reproductions, but reports on its presence were called for.

It occurred to us, also, that one of the conditions affecting ability to spell might be that capacity for quick and accurate visual perception of words which is measured in the "Reading Backwards Test." Accordingly all our observers were subjected to this test, using the material supplied by Stoelting.

The results of the various tests were as follows. In the test of auditory-verbal memory, the average percentage of words recalled was, for the good spellers, 50.3, with a mean variation of 11; for the bad spellers it was 46.6, m.v. 10.4. In the test of visual-verbal memory, the average for the good spellers was 39.4; m.v. 9; for the bad spellers 37.4, m.v. 10.2. In the test with visual non-verbal material (nonsense figures), the average per cent of lines correctly recalled was, for the good spellers, 40, m.v. 9.3; for the bad spellers 27.5, m.v. 8. In the reading backwards test the average time for the good spellers was 318 seconds, with a mean variation of 89; for the bad spellers it was 493.8 seconds, with a mean variation of 139.

It thus appears that the good spellers have as a group decidedly more accurate visual memory after-images of material that cannot be translated from visual into auditory-motor terms; and that they are as a group markedly superior in the speed with which words visually presented can be associated with auditory-motor processes. That these differences are not due to differences in the general ability of the two groups of observers is indicated by the fact that the groups are nearly equal in memory for verbal material, that is, material which can be learned in either visual or auditory-motor terms.